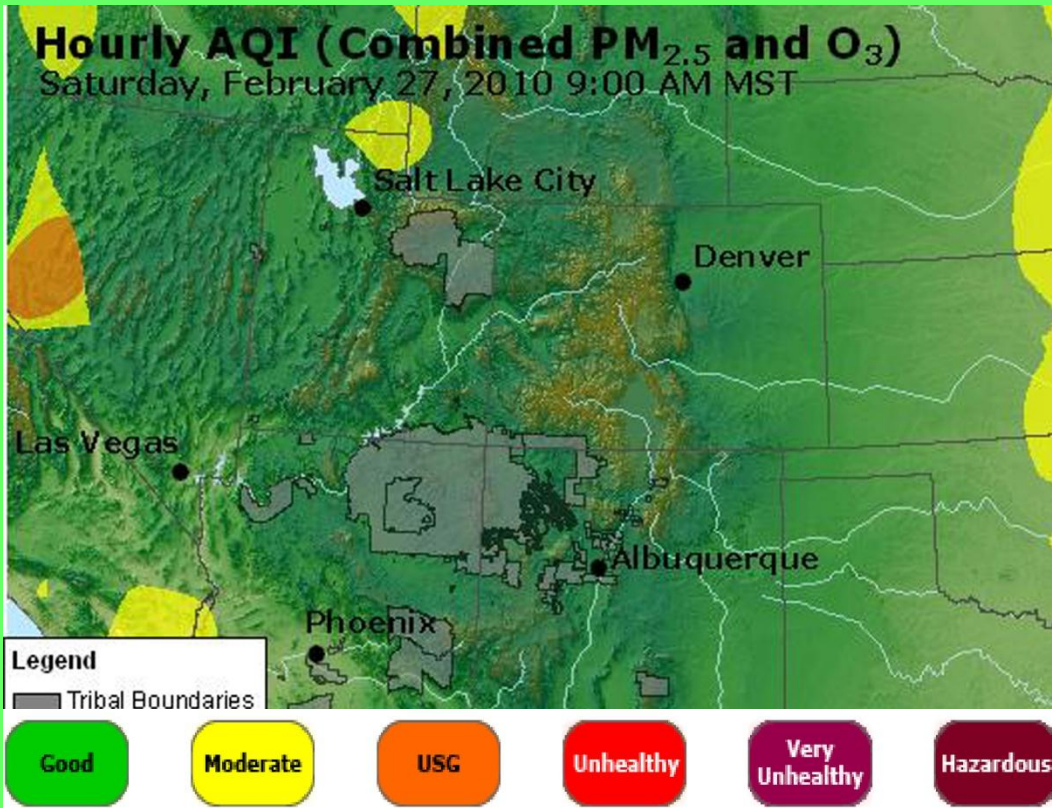


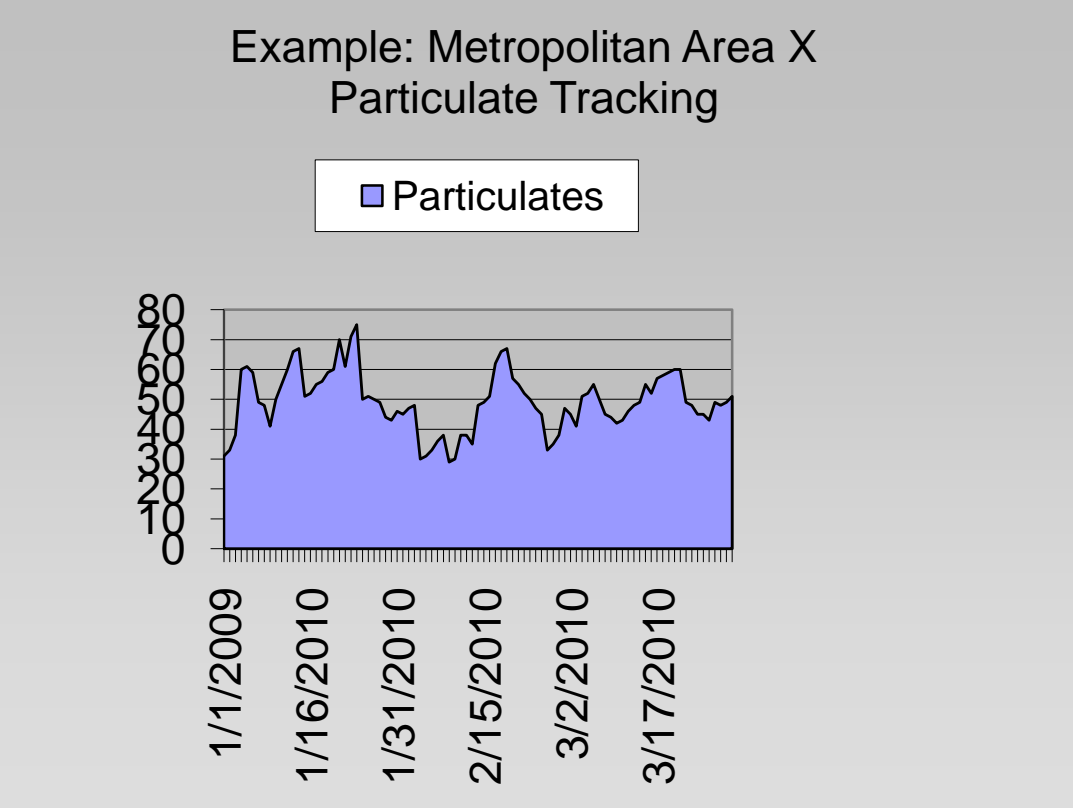
SCULPTURE TO MEASURE PARTICULATE AIR POLLUTION by ROBIN GAY
WAKELAND, M.Ed Make sculpture from laundry detergent bottles, found objects and thrift store fabric. Particulate air pollution collects on the white fabric. This black soot-like discoloration can be compared to particulate pollution quantities from EPA website for any geographic location. 21st century smog sculpture.



<http://airnow.gov/index.cfm?action=airnow.local>
<http://airnow.gov/index.cfm?action=airnow.local>



FLASH VIDEO on EPA website
<http://www.epa.gov/airnow/pm/pm.html>



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Robin Gay Wakeland, artist

SATISFIES THE FOLLOWING K-12 BENCHMARKS

ARTS Participate in the process of making and looking at works of art

LANGUAGE ART Locate and use a variety of resources to acquire information across the curriculum

MATH Analyze characteristics and properties of two- and three-dimensional geometric shapes
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them



DISASSEMBLE OBJECTS AND CUT APART PLASTIC BOTTLES

LESSON PLAN

Name and topic: Sculpture to measure particulate air pollution. Copyright Robin Gay Wakeland, M.Ed., artist.

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Grade/content area & benchmarks, objectives: **K-12 ARTS** Participate in the process of making and looking at works of art

Date: minimum 2 days or two weeks, 1 class period per day, or can be expanded. First week/day gathering recycled materials and found objects and find one example of outdoor sculpture in the neighborhood. Second week/day making a drawing of the proposed sculpture and component parts and assemble it.

Materials & Equipment: White fabric; plastic bottles and bottle caps; nylon cord; found objects; stapler; hole punch. Parents, teachers and youth club leaders, as well as high school shop students, can do preliminary deconstruction of found objects, cutting up plastic bottles, and drilling holes in objects.

Environment/grouping: Class listens together as leader/teacher shows slide show and describes project. Students contribute ideas of how to find materials, found objects, etc. to the group. Students contribute to the group by describing where they saw an outdoor sculpture nearby. Students work individually on their sculpture. Students present their finished sculpture the group and describe it and where they will install it. Students can take their sculpture home or install it at the school

Lesson Sequence: Teacher/youth group leaders show students the slide show and talk about it. Students are given homework to find an outdoor sculpture in the neighborhood and tell the class about it. Students gather found objects and plastic bottles. Parents, teachers, youth leaders and high school shop students do any drilling and working with sharp/power tools. Students do drawings of how their sculpture will look and make a list of materials needed and/or components prior to assembly. Students assemble sculpture and describe to class how they made it and where it will be installed.

Assessment: Are the sculptures 3-dimentional, or did students not grasp the idea of 3-dimensions and create flat objects? Were students able to use a drawing in the creative process to conceptualize, define, and articulate their ideas? Were students able to translate their drawing into a 3-D finished project?

REFERENCES

Epstein, J.L., & Dauber, S.L (1995). Effects on students of an interdisciplinary program linking social studies, art, and family volunteers in the middle grades. *Journal of Early Adolescence*. 15, p. 114-144.

Epstein, J.L. & Salinas, K.C. (1991). *TIPS social studies and art manual and prototype presentations*. Baltimore: Center on Families, Communities, Schools and Children's Learning, Johns Hopkins University.

lower achieving students (typically C, D and F students) scored as high as their A-B classmates on recall of visual shapes and content presented in art-appreciation classes taught by volunteers; primarily large, colorful paintings were used; art historical, literacy type information was included, such as name, date, and geographical location of the artist

Glenberg, A.M., Gutierrez, T., Levin, J.R., Japuntich, S., & Kaschak, M.P. (2004). Activity and imagined activity can enhance young children's reading comprehension. *Journal of Educational Psychology*. 96(3), p. 424-36.

The association of the physical world with text helps children make inferences to the real world and develop mental models and perceptual symbols and thus understand not merely the text itself but what the text means. This also contributes to cognitive development. Descriptions of previous studies in the literature using visuals and any kind of manipulative activity, including drawing, to teach literacy.

LESSON PLAN

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Grade/content area & benchmarks, objectives: **LANGUAGE ART K-12** Locate and use a variety of resources to acquire information across the curriculum

Dates can be structured within a variety of time periods; includes a longer period where sculpture is observed after other tasks are finished

Lesson Sequence: Find books on air pollution in the library. Higher grades: make annotated bibliography from library sources. Find visual image of air pollution on internet. Find images or take digital images or make observations (notes and drawings) in situ, on how air pollution shows up on outdoor objects (architecture, billboards, flags, etc.). When sculpture is installed outside, students take digital photos or make observations about air pollution showing up on white fabric.

Materials & Equipment: library, computer, internet connection, projector, digital camera (optional), paper and pencil to take notes and make drawings; word processing and slide show software

Grouping, Environment: Class listens together as leader/teacher shows slide show and describes project and shows EPA flash video about particulate air pollution. Students go as a group to the library. Students find books individually at library (lower grades: with help from teacher). Students take digital photos or make observations and take notes individually, except younger grades, which go as a group on a field trip to make observations outside (architecture, flags, outdoor objects). For younger grades, teacher can supervise students taking digital photos. Students work on writing up their findings individually and give verbal description to group. Older grades can produce slide shows.

Lesson Sequence: Teacher/youth group leaders show students the slide show and talk about it, view EPA flash video. Students go to library and look for books about air pollution and use computers to search for images of air pollution. Students are given homework (older grades) or go in a group (younger grades) to observe and take digital images of air pollution showing up in the neighborhood and on sculpture. Students compile info in written form and also give verbal report to class or older students can produce a slide show and present it to the class.

Assessment: What library sources were used for lookup? What books and images were found? How well did older students understand and complete the annotated bibliography? Students' notes, drawings, and digital photos, as well as their reports are tangible assessment subjects.

REFERENCES:

EPA main login page

<http://airnow.gov/index.cfm?action=airnow.local>

flash movie about particulate air pollution on EPA home page

<http://www.epa.gov/airnow/pm/pm.html>

particulate pollution tab

<http://airnow.gov/index.cfm?action=airnow.local>

LESSON PLAN

Name and topic: Sculpture to measure particulate air pollution. Copyright Robin Gay Wakeland, M.Ed., artist. Permission granted to copy for non-commercial educational purposes. Contact rgw4036@prodigy.net

Grade/content area & benchmarks, objectives: **K-12 MATH** Analyze characteristics and properties of two- and three-dimensional geometric shapes. Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

Dates: 2 weeks of regular class time, once a day; longer time span to observe sculpture & EPA data. First week, students analyze geometrical shapes in slide show, and in their own drawings and sculpture created in the arts lesson. Over time: make observations and/or take digital images of white fabric to record particulate air pollution and record EPA particulate pollution for the geographical area.

Materials & Equipment: Digital camera (optional); computer and access to internet and EPA website; computer spreadsheets software with chart/graphs; examples of 2 and 3 dimensional geometrical objects and shapes; students' finished sculptures and drawings.

Grouping, Environment: Class listens together as teacher/group leader shows slide show and geometrical models, and compares sculpture with these objects. Students individually analyze 2-D and 3-D geometric components of their own completed drawings and sculpture, and record EPA data into spreadsheets.

Lesson Sequence: Teachers and youth group leaders show slide show and compare geometric models to the sculpture. Students compare their own drawings for their sculpture, as well as the finished sculpture, with geometrical shapes. Over time: students make observations and/or take digital images of white fabric to record particulate air pollution and record EPA particulate pollution for the geographical area. Higher grades: plot data from EPA website into spreadsheet and create graphs and charts from it. Compare the particulate pollution collecting on the white fabric with this data.

Assessment: Have students mastered computer skills of entering data into spreadsheets and creating charts and graphs? Can they recognize 2D & 3D geometric shapes in the slide show sculpture and their own drawings and sculpture? Can they name and describe the various geometrical shapes? Do they recognize that particulate air pollution collects on fabric? Do they understand the concept of more particulates collecting on the fabric over time and what the digital images of the sculpture over time mean?

REFERENCES:

EPA main login page

<http://airnow.gov/index.cfm?action=airnow.local>

particulate pollution tab

<http://airnow.gov/index.cfm?action=airnow.local>

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APPLICATION FORM AND GUIDELINES

<http://www.toshiba.com/tafpub/jsp/recentgrants/712.jsp>

Lapadat, M. (1995). How parents can help us teach science. *The Hoosier Science Teacher*. 21(2):60-63. Activities parents can do with their children to teach science.